Amendments to the Claims

This listing of claims will replace all prior versions, or listings, or claims in the application.

Listing of Claims:

1. (currently amended) Physical shock hardened heat sink inclusive semiconductor device mounting ~~apparatus~~ comprising the combination of:

a physical shock resistant printed circuit board composed of electrical insulating material and including ~~supporting~~ on at least a first surface thereof an array of metallic film electrical conductors;

a metallic ~~T cross-sectioned~~ heat sink ~~metallic body~~ member having a T stem body portion ~~element of substantial width and length and extended depth dimensions received in~~ extending in transverse relationship with ~~of~~ an aperture opening of said printed circuit board;

said metallic ~~T cross-sectioned~~ heat sink ~~metallic body~~ member including integral T arm portions located at a T stem extremity and extending along and beyond said T stem body portion in intimate proximity with first surface portions ~~element substantial width dimension along a first surface~~ of said printed circuit board;

said metallic ~~T cross-sectioned~~ heat sink ~~metallic body~~ member also including ~~first and second of said T arm portions disposed at opposed depth dimension ends of said T stem body element extended depth dimension and a heat sink metallic body member saddle region~~ a semiconductor device reception area saddle region located intermediate said first and second pairs of integral T arm portions on ~~a depth dimension portion of~~ said metallic heat sink ~~metallic body~~ member; and

said heat sink T stem body portion ~~cross-sectioned heat sink metallic body member~~ including a T stem body portion ~~element~~ slot member ~~and a T stem body element slot member engaged keeper member disposed~~ in alignment with ~~along~~ a second surface of said printed circuit board and enabling a keeper member retention of ~~to hold~~ said printed circuit board in captured engagement with a ~~between said~~ T arm portion ~~portions~~ during a physical shock event ~~and said slot member engaged keeper member~~.

2. (currently amended) The physical shock hardened heat sink inclusive semiconductor device ~~mounting~~ apparatus of claim 1 wherein said metallic film electrical

conductors and said T cross-sectioned heat sink metallic body member are comprised of metallic copper.

3. (currently amended) The physical shock hardened heat sink inclusive semiconductor device ~~mounting~~ apparatus of claim 2 wherein said T cross-sectioned heat sink metallic body member T arm portions are connected by tin/lead solder with selected portions of said printed circuit board surface array of metallic film electrical conductors.

4. (currently amended) The physical shock hardened heat sink inclusive semiconductor device ~~mounting~~ apparatus of claim 1 wherein said first and second of said T arm portions are of rectangular cross section.

5. (currently amended) The physical shock hardened heat sink inclusive semiconductor device ~~mounting~~ apparatus of claim 1 further including a semiconductor device received in intimate thermal contact with said heat sink metallic body member saddle region.

6. (currently amended) The physical shock hardened heat sink inclusive semiconductor device ~~mounting~~ apparatus of claim 5 wherein said semiconductor device intimate thermal contact includes a solder interface connection with a saddle region portion of said heat sink.

7. (currently amended) The physical shock hardened heat sink inclusive semiconductor device ~~mounting~~ apparatus of claim 5 wherein said semiconductor device intimate thermal contact includes a thermally conductive silicone material interface connection with said saddle region portion of said heat sink.

8. (currently amended) The physical shock hardened heat sink inclusive semiconductor device ~~mounting~~ apparatus of claim 2 wherein said printed circuit board includes a second array of metallic film electrical conductors on a second surface thereof and wherein said T stem body element ~~slot member engaged~~ keeper member includes a tin/lead solder interface connection with said second array of metallic film electrical conductors on said second printed circuit board surface.

9. (currently amended) The physical shock hardened heat sink inclusive semiconductor device ~~mounting~~ apparatus of claim 1 further including a second T stem body element slot member and a second T stem body element slot member-engaged keeper member disposed along a ~~said~~ second surface of said printed circuit board and additionally holding said printed circuit board in captured engagement between said T arm portions and a ~~said~~ slot member-engaged keeper member.

10. (currently amended) The physical shock hardened heat sink inclusive semiconductor device ~~mounting~~ apparatus of claim 1 wherein said heat sink metallic body member saddle region semiconductor device reception area is disposed in a coplanar flush relationship with said printed circuit board first surface.

11. (currently amended) The high G-force physical impact tolerant, high thermal conductivity and low electrical inductance method of mounting ~~and heat sinking~~ a semiconductor device and heat sink comprising the steps of:

disposing said semiconductor device in a ~~flowed thermal conductive media maintained~~ solidified liquid interface inclusive intimate physical, thermal, and electrical contact with a metallic heat sink element of selected ~~conductive metal~~ thermal and electrical conductivity characteristics;

said disposing step also including locating said semiconductor device in high G-force physical impact tolerant ~~at least~~ unidirectional physical restraint intermediate integral structural portions of said metallic heat sink element;

suspending said metallic heat sink element and said semiconductor device in captive confinement within an aperture of an electrically insulating high G-force physical impact tolerant printed circuit board;

retaining said metallic heat sink element within said aperture of said electrically insulating high G-force physical impact tolerant printed circuit board using metallic heat sink-connected metallic wing elements spreading across lateral surface portions of said printed circuit board adjacent said aperture; and

bonding selected portions of one of said metallic heat sink element and said metallic heat sink-connected metallic wing elements with adjacent electrically and thermally conductive ~~electrically grounded~~ film wiring conductors located on a surface of said printed circuit board.

12. (currently amended) The high G-force physical impact tolerant, high thermal conductivity and low electrical inductance method of mounting ~~and heat sinking~~ a semiconductor device and heat sink of claim 11 wherein said disposing step and said bonding step each include a soldering with tin/lead solder step.

13. (currently amended) Impact resistant semiconductor device mounting and cooling apparatus comprising the combination of:

a printed circuit board having electrical conductors arrayed on first and second surfaces thereof and having a shaped transverse opening located in a selected portion thereof;

an integral metallic heat sink member of first cross section shape conforming with said printed circuit board shaped transverse opening and disposed within said transverse opening;

said integral metallic heat sink member having a second cross sectional shape orthogonal to ~~of~~ said first cross sectional shape and inclusive of a wing element portion extending along said printed circuit board first surface; and

said integral metallic heat sink member having a third cross sectional shape orthogonal to ~~of~~ both said first cross sectional shape and said second cross sectional shape and including a recessed saddle portion parallel with said printed circuit board along a first cross sectional extremity and a grooved recess parallel with and adjacent said printed circuit board second surface along a second cross sectional extremity.

14. (original) The impact resistant semiconductor device mounting and cooling apparatus of claim 13 wherein said first cross sectional shape also includes said second cross sectional shape wing members.

15. (original) The impact resistant semiconductor device mounting and cooling apparatus of claim 13 wherein said integral metallic heat sink member third cross sectional shape recessed saddle portion and said printed circuit board first surface electrical conductors are disposed in substantially coplanar elevation.

16. (original) The impact resistant semiconductor device mounting and cooling apparatus of claim 13 further including a second grooved recess parallel with and adjacent said printed circuit board second surface and received in a third extremity of said third cross sectional shape.

17. (original) The impact resistant semiconductor device mounting and cooling apparatus of claim 16 further including a first and second metallic keeper members engaged with said first and second grooved recesses and capturing said printed circuit board intermediate said first cross sectional shape wing element portion and said first and second metallic keeper members.

18. (original) The impact resistant semiconductor device mounting and cooling apparatus of claim 17 wherein said first and second metallic keeper members and said first

cross sectional shape wing element portion are engaged with said printed circuit board first and second surface electrical conductors by tin/lead solder.

19. (original) The impact resistant semiconductor device mounting and cooling apparatus of claim 13 wherein said integral metallic heat sink member also comprises an electrical current conducting portion of said printed circuit board first and second surface electrical conductors.

20. (original) The impact resistant semiconductor device mounting and cooling apparatus of claim 13 wherein said metallic heat sink member third cross sectional shape recessed saddle portion is disposed in a coplanar relationship with a topside surface of said printed circuit board and wherein a metal window portion of a heat sink-mounted semiconductor device is soldered to said saddle portion with circuit leads of said semiconductor device overhanging said saddle portion and engaging topside circuit conductors of said printed circuit board.

21. (new) The high G-force physical impact tolerant, high thermal conductivity and low electrical inductance method of mounting a semiconductor device and heat sink of claim 12 wherein said step of bonding selected portions of one of said metallic heat sink element and said metallic heat sink-connected metallic wing elements with adjacent electrically and thermally conductive film wiring conductors located on a surface of said printed circuit board includes bonding selected portions of each of said metallic heat sink element and said metallic heat sink-connected metallic wing elements with adjacent electrically and thermally conductive film wiring conductors located on each surface of said printed circuit board.

22. (new) The high G-force physical impact tolerant, high thermal conductivity and low electrical inductance method of mounting a semiconductor device and heat sink of claim 21 wherein said bonded selected portions of each of said metallic heat sink element comprise heat sink-integral wing elements.

23. (new) The high G-force physical impact tolerant, high thermal conductivity and low electrical inductance method of mounting a semiconductor device and heat sink of claim 11 wherein one of said disposing step and said bonding step include application of a hardenable liquid organic material.